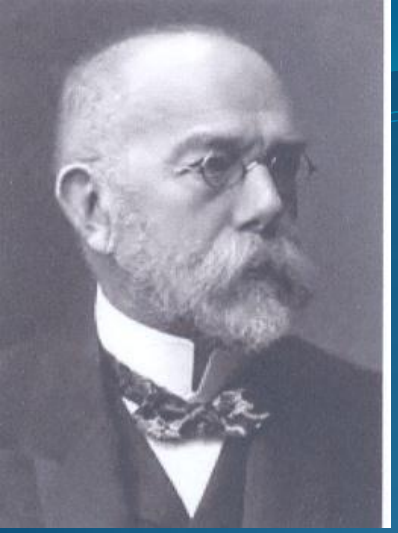
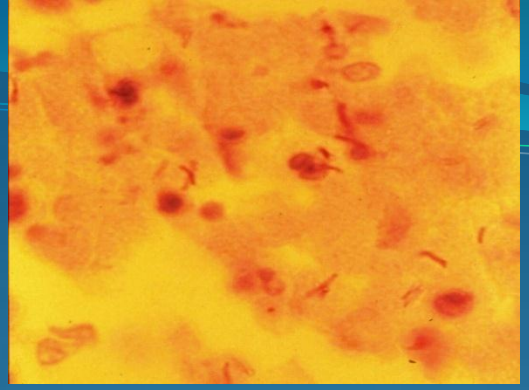




Public Health Role in Tuberculosis control

August 2, 2013

Harry K. Tweel, MD

Physician Director

Cabell-Huntington Health Department

True/ False Questions

- 1. Tuberculosis outbreaks occur about in WV about every 4 to 5 years.
- 2. Tuberculosis is highly contagious.
- 3. Prophylactic tuberculosis therapy is over 90% effective in preventing future progressive (active) tuberculosis in an individual whom has been recently infected.

True/ False Questions

- 4. Young children exposed to a parent with active tuberculosis often have a negative PPD skin test because they are more resistant to becoming infected.
- 5. In West Virginia close contacts of known active cases can not be forced to be evaluated even if they have a positive PPD.

HISTORY OF TUBERCULOSIS

- TB: Major Cause of Suffering and Death
- **First human case 3400 BC**
- **Consumption, White Plague, scrofula, King's Evil, pthisis**
- **England 1815: 1 in 4 deaths**
- **France 1918: 1 in 6 deaths**
- **During 20thC, TB killed ~100 million**

Timothy Cratchit
aka Tiny Tim

- **Tiny Tim known based on invalid son of Dicken's friend**
- **1997 Excavation at St. Andrew's Church found 19C gravesite**
- **"*In Memory. Timothy Cratchit. 1839–1884, Beloved Husband of Julia, Father of Robert, and Son of Robert and Martha.*"**
- **Skeletal remains of 40yo man wearing metal frame and leather on legs and back**
- **PCR confirmed Tuberculosis***

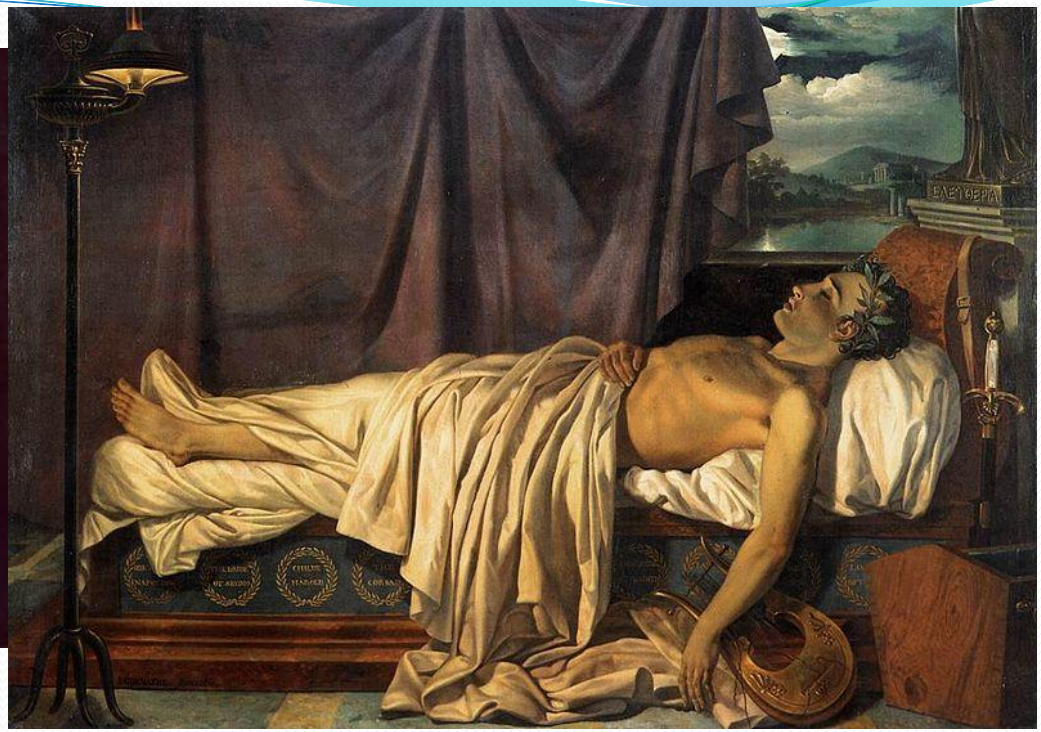
*CW Callahan. JID 1997;176:1653–4

HISTORY OF TUBERCULOSIS

- At the height of the Romantic movement tuberculosis was declared to be:
- "The mark of spirituality or the wages paid by those seemingly touched by a burning creativity."

HISTORY OF TUBERCULOSIS

- Mark of beauty-pale consumptive look
  - 1858 painting of Queen Guinevere by William Morris
- La Boheme- Mimi
- La Dame aux Camelias- Margrerite



“I look pale . . . I should like to die of consumption – because the ladies would say ‘Look at poor Byron, how interesting he looks in dying’.”

Lord Byron (1788-1824)

HISTORY OF TUBERCULOSIS

- Robert Koch(1843-1910)
- Discovery Tuberculosis bacillus
- April 10, 1882
  - Berlin Physiological Society

HISTORY OF TUBERCULOSIS

- Sanatorium Movement

- National association for the study and prevention of tuberculosis 1904.
- Rapid growth.
  - 11,953 beds in 1908
  - 30,000 beds in 1915
  - 97,726 beds in 1942 (peak)

HISTORY OF TUBERCULOSIS

- Tuberculosis Nursing

Nurse crossing roofs to visit patients

With no drug therapies, past TB suffers like these in 1953 were isolated in sanatoriums.

Tuberculosis today

Still a Major Cause of Suffering and Death

- *One third of the world's population are infected with TB*
- *9 million people worldwide become sick with TB each year*
- *2 million will die each year of TB related disease*
- *TB is the leading killer of people who are HIV infected.*

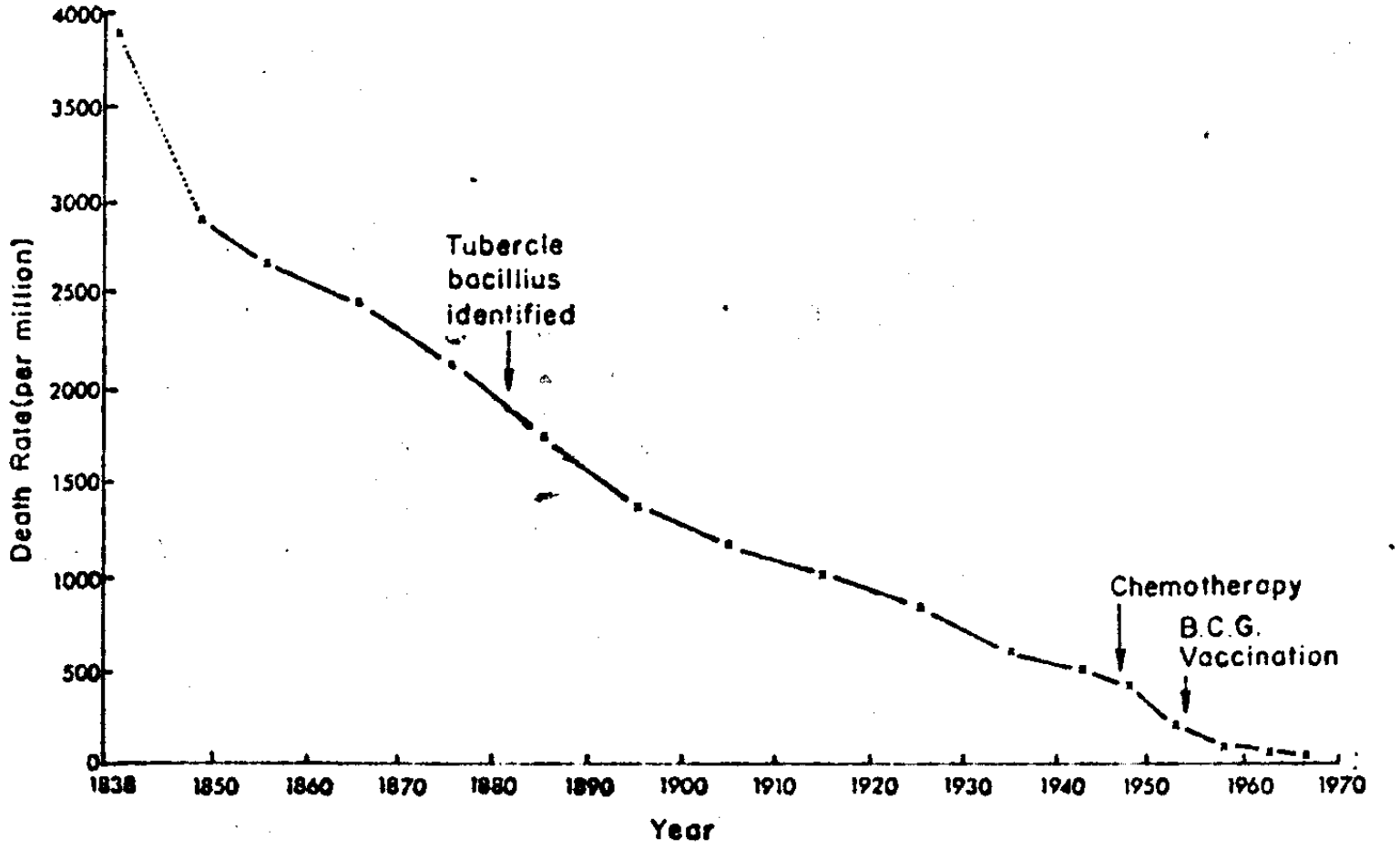
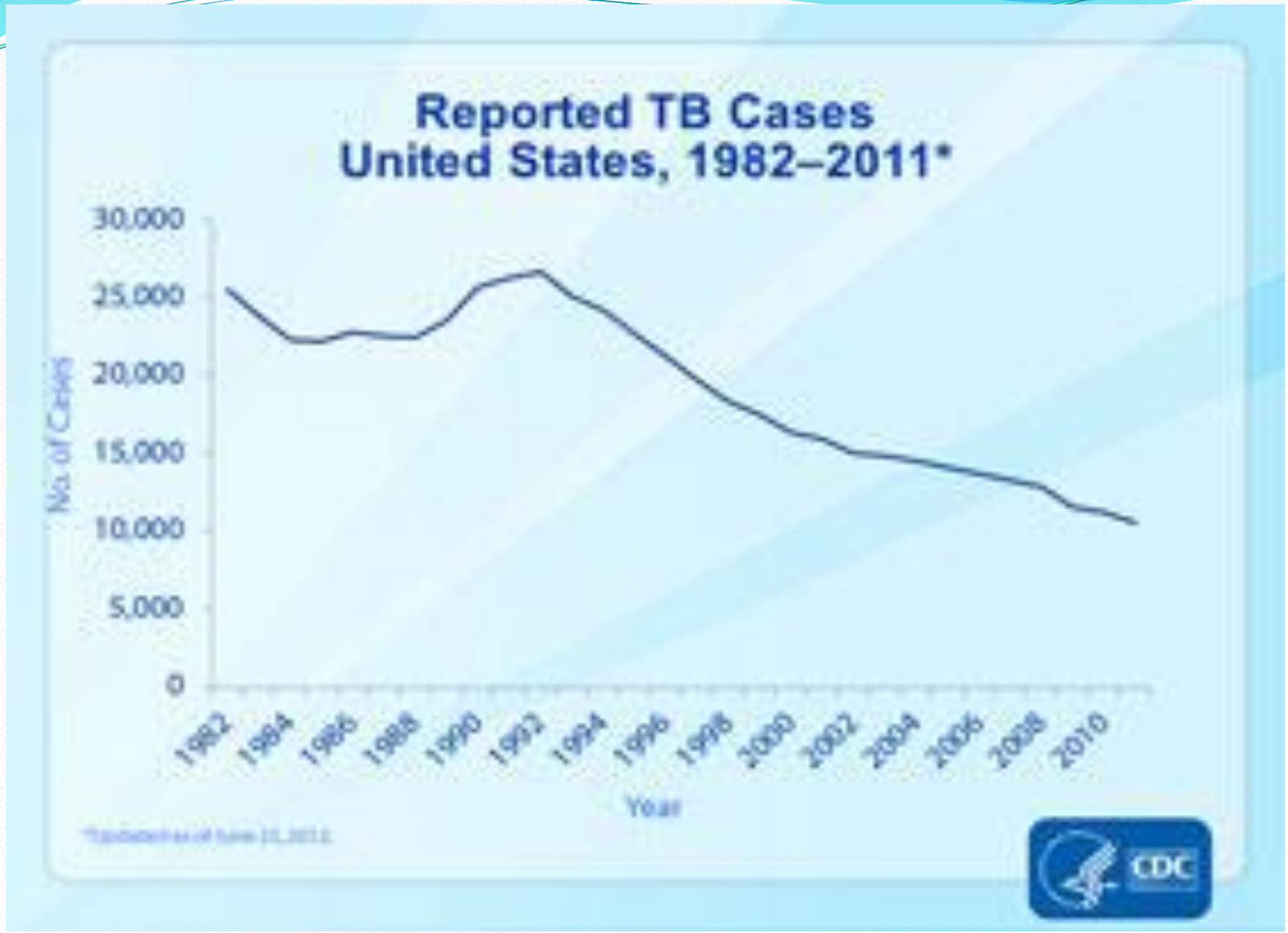


Fig. 1. Respiratory tuberculosis: mean annual death rate, England and Wales. (*Reproduced with permission from McKeown T, Lowe CR. An Introduction to Social Medicine. Oxford: Blackwell, 1974.*)

TB Morbidity
United States, 2006–2011

Year	No.	Rate*
2006	13,727	4.6
2007	13,278	4.4
2008	12,895	4.2
2009	11,528	3.8
2010	11,171	3.6
2011	10,528	3.4

*Cases per 100,000. Updated as of June 22, 2012.


Reported TB Cases
United States, 1982–2011*
30,000
25,000
20,000
15,000
10,000
5,000
0
No. of Cases
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
Year
CDC

Tuberculosis in WV

Year	Active cases	New cases	Deaths
1950	6,107	2,099	428
1960	4,563	676	105
1970	3,077	329	65
1980	----	203	10.4
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2012	----	8	0

Tuberculosis 2013 contacts to MDR case

Cabell-Huntington Health Department

Public Health Role in Tuberculosis control

Tuberculosis control

All aspects of control

Detection

Prevention

Treatment programs

Tuberculosis control

Surveillance

Case containment

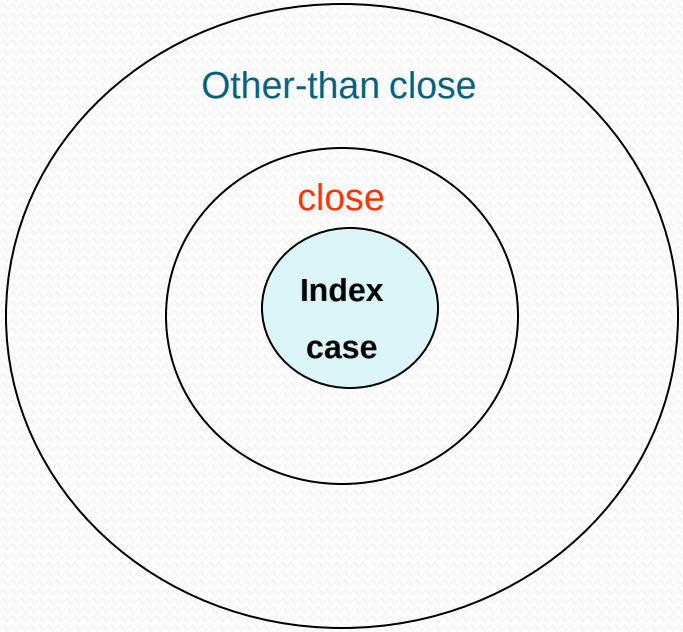
prevention

Tuberculosis control

- Source or suspected Case
  - Confirmed case
  - Suspected case

Contact investigation

concentric circle

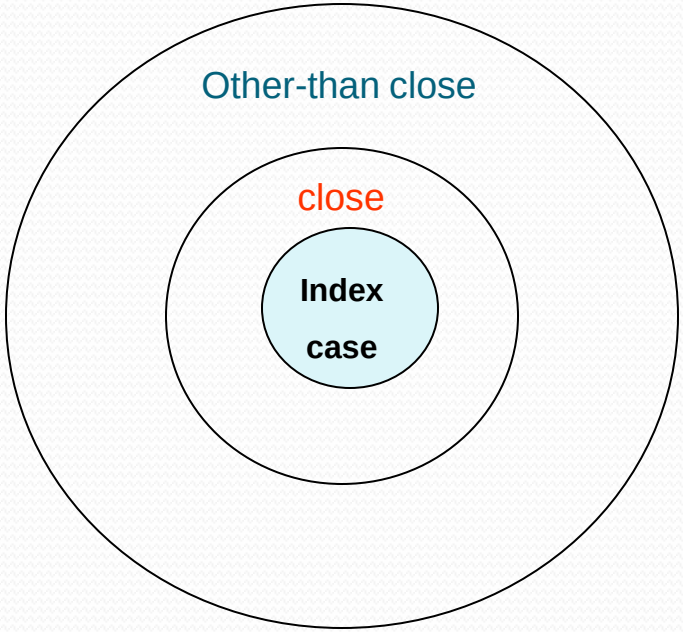


Contact investigation

concentric circle / 3 months prior to Rx

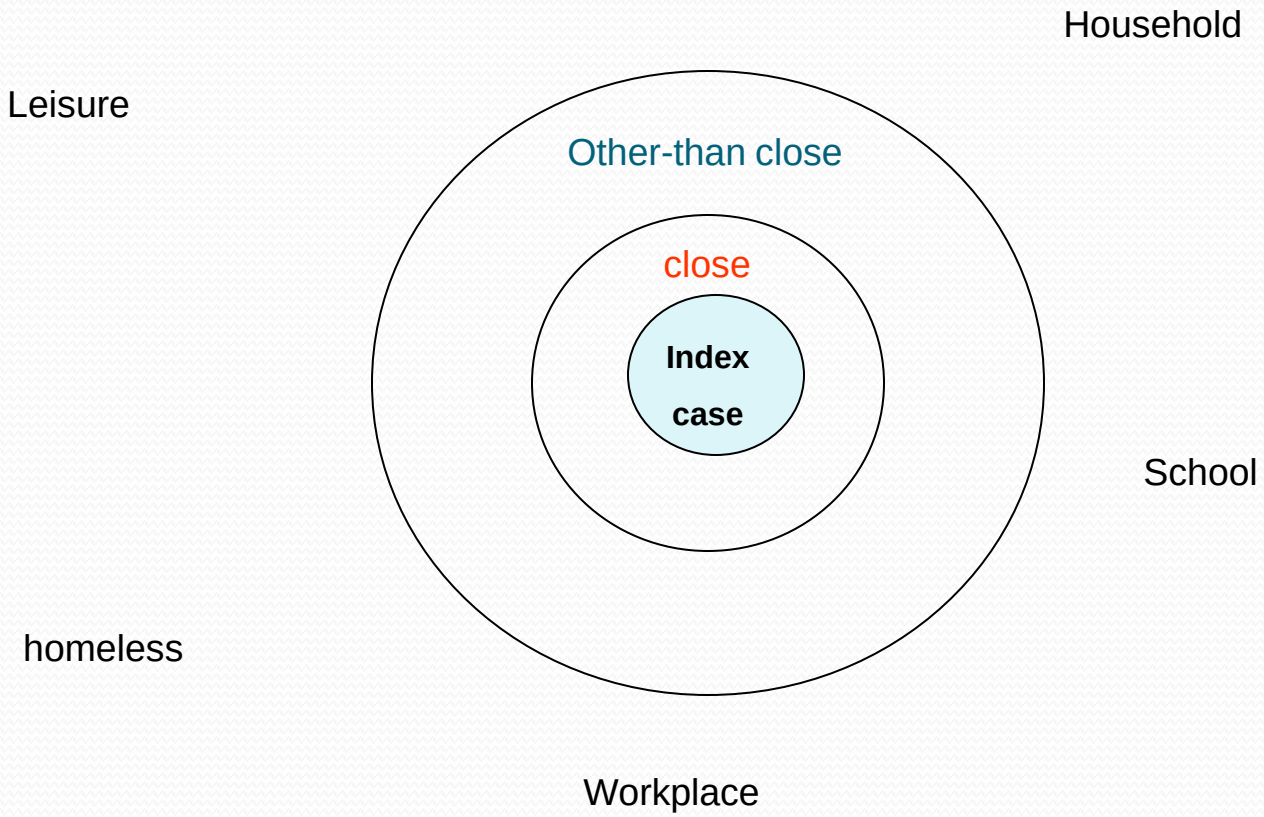
Close contact

8 hr / week



Contact investigation

concentric circle



Contact investigation

Close contacts most likely to be infected:

1. Contacts to patients with high degree of infectiousness based on the following factors:
   - Laryngeal or pulmonary Tuberculosis
   - AFB smear positive
   - Cavitary disease on Chest X-ray
   - Cough

Contact investigation

Close contacts most likely to be infected:

- 2. Contacts exposed to patients in:
  - Congregate settings
  - Small or crowded rooms
  - Areas that are poorly ventilated
  - Areas without air-cleaning systems

Contact investigation

Close contacts most likely to be infected:

- Congregate settings
  - prison
  - shelters
  - nursing homes
  - single-room-occupancy hotels
  - health care facilities

Close contacts most likely to be infected:

Close contacts most likely to be infected:

- Contacts who:
  - Have prolonged exposure (longer than 8 hours per week during infectious period)
  - Have been physically close to the patient

Contact investigation

Contacts at high risk of developing tuberculosis once infected

- 1. Contacts who are young children less than 5 years of age.
- 2. Contacts with any of these conditions:
  - HIV infection/AIDS or those at high risk for HIV infection who refuse HIV testing.
  - Injection of drugs
  - Diabetes mellitus
  - Silicosis

Contact investigation

Contacts at high risk of developing tuberculosis once infected

- 2. Contacts with any of these conditions:
  - Prolonged corticosteroid therapy
  - Immunosuppressive therapy
  - Chemotherapy
  - Certain types of Cancers (i. g. Carcinoma of the head, neck , or lungs) or hematological disorders (i. e. leukemia and lymphoma)

Contact investigation

Contacts at high risk of developing tuberculosis once infected

- 2. Contacts with any of these conditions:
  - Chronic renal failure
  - Gastrectomy or jejunoileal bypass
  - Low body weight (10% or greater below ideal)
  - Fibrotic lesions on CXR consistent with old Tuberculosis

Calculating the infectious period

- Usually starts 12 weeks prior to treatment and ends when contact with infected person is removed from interaction with contacts
  - This period is extended in the case of MDRTB
  - The period may be extended if history reveals an earlier start of symptoms.
  - If patient reverts from Negative cultures to Positive a new infectious period must be established. History is critical in this revision.

Disease investigation & Management

- Assessing Risk of Transmission
  - *based on the characteristics of the source case*
    - AFB smear Positive (higher the smear grade, higher risk)
    - Site (pulmonary or laryngeal tuberculosis)
    - Cavitary disease
    - Cough or hoarseness

Disease investigation & Management

- Assessing Risk of Transmission
  - *Based on environmental factors*
    - Small room size
    - Poor ventilation (lack of windows)

Disease investigation & Management

- Assessing Risk of Transmission
  - *Based on the extent of exposure*
    - Prolonged exposure *greater than 8 hours of exposure*
    - Frequent exposure
    - Close physical proximity *(i. e. sleeping in the same room)*

Evaluation & Management of Contacts

- All close contacts should be evaluated for symptoms

1. Highest priority for further testing are those who exhibit symptoms of TB.

- Test with:
  - IPPD or IGRA (t-spot)
  - Chest X-ray
  - Sputum smears & cultures (with drug susceptibility testing)
  - Also look for extra pulmonary sites

Evaluation & Management of Contacts

- All close contacts should be evaluated for symptoms

2. Contacts with definite symptoms of TB should be treated: (With or without a positive chest X-ray finding consistent with TB)

  - Await TB culture results

Evaluation & Management of Contacts

- All close contacts should be evaluated for symptoms

3. Patients with vague symptoms
   - Withhold treatment until evaluation is complete.

Evaluation & Management of Contacts

- All close contacts should be evaluated for symptoms

3. Patients with vague symptoms
   - Withhold treatment until evaluation is complete.

   - This includes withholding LTBI treatment

Evaluation & Management of Contacts

- All close contacts should be evaluated for symptoms

4. Contacts with symptoms are class 5 (High)

Evaluation & Management of Contacts

- All close contacts should be evaluated for symptoms

4. Contacts with symptoms are class 5 (High)

   Regardless of initial lab findings:

   CXR

   IPPD or IGRA

Evaluation & Management of Contacts

- HIV testing
  - Who should be tested?

Evaluation & Management of Contacts

- HIV testing
  - All contacts
  - Those with HIV risk behavior should be closely monitored & referred when appropriate.

Evaluation & Management of Contacts

Individuals Who Need Medical Evaluation and Chest Radiograph

Status		
New Positive Test for TB Infection	**Prior Positive Test for TB Infection**	**Regardless of Test for TB Infection Result (+ or - TTBI)**
• Contacts (close and other than close) • Persons being evaluated in source case investigation	• Symptomatic • Persons being evaluated in source case investigation • Additional persons with heavy exposure	• Contacts with HIV infection or other medical risk factors • Children younger than 5 years of age identified during window period • Anyone with symptoms suggestive of tuberculosis, regardless of TTBI result or age • Sexual contacts of HIV-infected index patients • All associates in a source case investigation

Evaluation & Management of Contacts

- Contacts with a negative IPPD or IGRA (class I)

  Why are they class 1?

Evaluation & Management of Contacts

- Contacts with a negative IPPD or IGRA (class I)
  - Repeat testing in 8 to 12 weeks.
  - Of the negative test group who should have an X-ray & clinical evaluation during the 8 weeks period?

Evaluation & Management of Contacts

- Contacts with a negative IPPD or IGRA who need a chest X-ray & medical evaluation:
  - Contacts younger than 5 years of age
  - Contacts between 5 and 15 years of age at physicians request
  - Contacts who are HIV positive
  - Contacts who are Immunosuppressed
  - HIV risk patients who refuse HIV testing

Evaluation & Management of Contacts

- Contacts with a positive IPPD or IGRA
  - Chest X-ray and physical are normal (class 2)
  - Chest X-ray or Physical evidence suggest TB (class 5)

Evaluation & Management of Contacts

- Contacts with a positive IPPD or IGRA
  - Chest X-ray and physical are normal (class 2) Start LTBI treatment
  - Chest X-ray or Physical evidence suggest TB (class 5) Evaluate for TB disease before starting treatment

Evaluation & Management of Contacts

- Who needs evaluation & Chest X-ray
  - All contacts with a positive IPPD or IGRA
  - Any contact with a prior history of a positive IPPD/IGRA
  - Any contact with a prior history of TB

Evaluation & Management of Contacts

- Who needs evaluation & Chest X-ray
  - Contacts with HIV or other immunosuppressive conditions with or without a positive IPPD/IGRA
  - Children less than 5 years of age (regardless of IPPD results)
  - All persons with symptoms (regardless of IPPD/IGRA results)
  - Sexual partners of HIV infected contact individuals who refuse HIV testing

Evaluation & Management of Contacts

- 6 week follow-up testing:
  - 1. Negative test with no further contact to source case (Class 1)
    - May discontinue LTBI treatment

Evaluation & Management of Contacts

- 8 week follow-up testing:
  - 1. Negative test with no further contact to source case (Class 1)
    - May discontinue LTBI treatment

    2. Negative test with continues close contact with source case

    Continue LTBI if other risk factors

Evaluation & Management of Contacts

- 8 week follow-up testing:
  - 1. Negative test with no further contact to source case (Class 1)

    2. Negative test with continues close contact with source case

    Reevaluate every 3 months with a chest X-ray & evaluation

Evaluation & Management of Contacts

- Those who have a positive culture during the interim period (Class 5)
  - Is now a new source case requiring full treatment & new investigation

Evaluation & Management of Contacts

- Expanding a contact investigation recommended when the index case fits one or more of these criteria:
  - Homeless living in a congregate setting, shelter or single-room-occupancy hotel
  - Works in or attends a school or day care facility
  - Works in a potentially sensitive worksite
  - Works in a setting where the coworkers are aware of the TB diagnosis

Evaluation & Management of Contacts

- Expanding a contact investigation recommended when the index case fits one or more of these criteria:
  - Works, studies, or lives in a setting with 15 or moore individuals
  - Is a health care worker
  - Has traveled during the infectious period for 8 or more hours on an airplane train, or bus.
  - Attends a place of worship regularly during the infectious period

Evaluation & Management of Contacts

- Expanding a contact investigation recommended when the index case fits one or more of these criteria:
  - Attended an after school program or other extracurricular programs during the infectious period
  - Frequently in a health care setting during the infectious period
    - Especially if not appropriately isolated during a hospitalization or frequent clinic visits

Evaluation & Management of Contacts

- Latent Tuberculosis infection
  - Short course therapy (12 weeks) DOT
  - Standard 6 or 9 months therapy
    - Source case finding
    - Regular follow-up
    - Observe for drug toxic effects

Tuberculosis contact investigation at the Cabell-Huntington Health Department 2013

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2013	----	7	0

Tuberculosis 2013

Cabell-Huntington Health Department

Number of new cases	Number of contacts identified	Number of contacts test or Evaluated	Number with LTBI	Number started on treatment after sorting by risk
7	4022	3760	65	45

Tuberculosis 2013

Cabell-Huntington Health Department

Number of LTBI	Number who were candidates for LTBI treatment	Number started on treatment	Number who have completed treatment
58	53	45	33

Reasons for not completing LTBI

Adverse Medication reaction	Patient chose to stop	Patient lost to follow-up
1	2	3

Tuberculosis 2013

Cabell-Huntington Health Department

Case	Contacts	Positive PPD	Positive T-spot	On treatment
1				
2				
3				
4				
5				
6				
7				

Tuberculosis is a social disease with medical implications.

True/ False Questions

- 1. Tuberculosis outbreaks occur about in WV about every 4 to 5 years.
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True/ False Questions

- 4. Young children exposed to a parent with active tuberculosis often have a negative PPD skin test because they are more resistant to becoming infected.
- 5. In West Virginia close contacts of known active cases can not be forced to be evaluated even if they have a positive PPD.

Role of Nursing today in Direct observed Therapy

- Tuberculosis Nursing

Nurse crossing roofs to visit patients

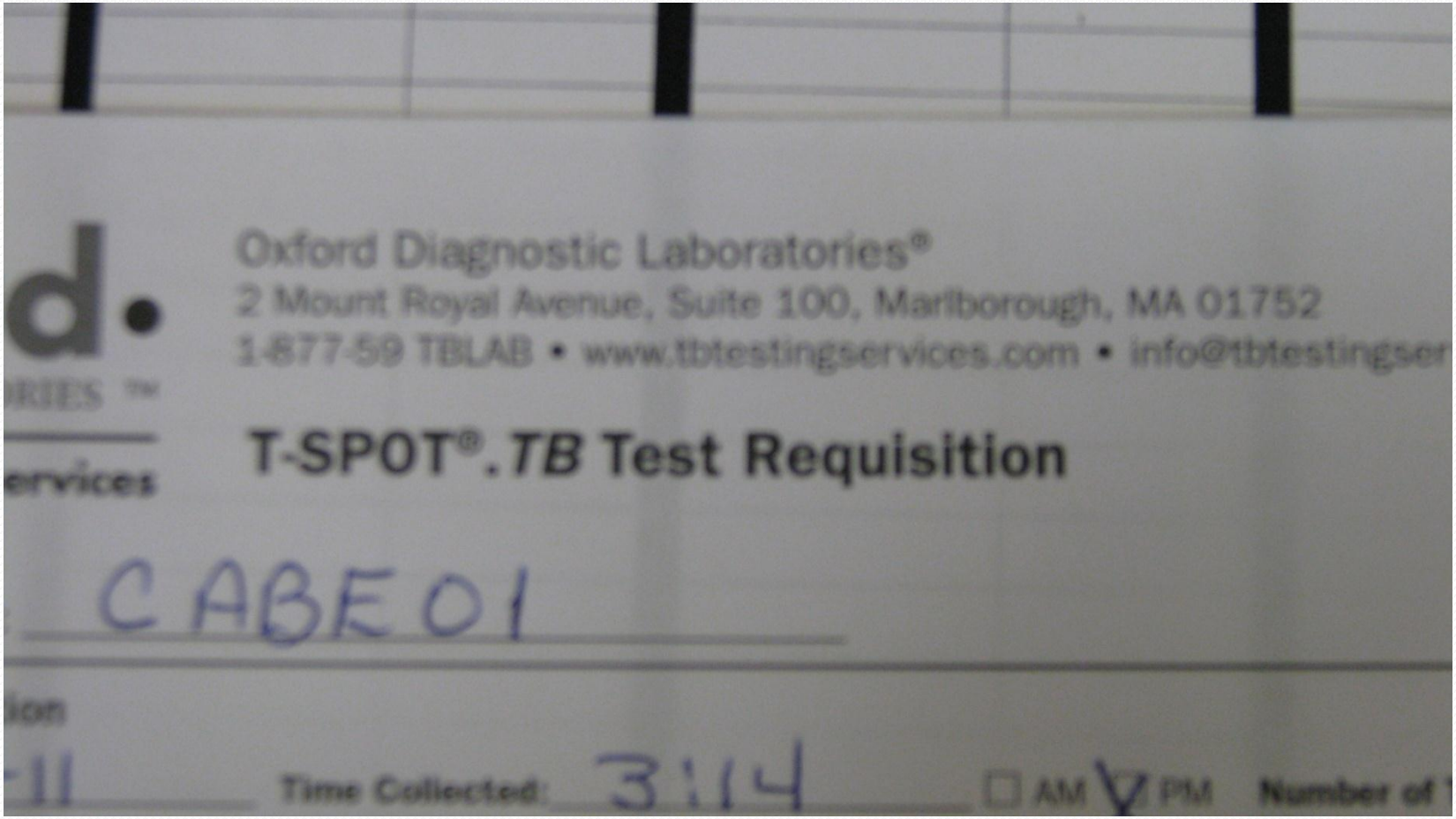

Diagnostic Specimens
First Aid Kit
oxford
Packaging and Shipping Instructions
White Copy with Specimen
Yellow = Karen
Pink - Natalie
CARR
Certificate of Appreciation
Draw 2 tubes (gray)
Fill tubes all the way up

TBC nursing 2012

TBC nursing 2012

TBC nursing 2012

TBC nursing 2012



TBC evaluation & Therapy

TBC evaluation & Therapy

TBC nursing 2012

Summary

- WV has a high standard for the care of tuberculosis patients.
- The Cabell-Huntington Health Department embraces the challenge & the complexity of proper treatment in order to eliminate tuberculosis. (DOT & contact investigation)
- We treat these patients with respect and compassion for our best chance of success

Eliminate tuberculosis in the US

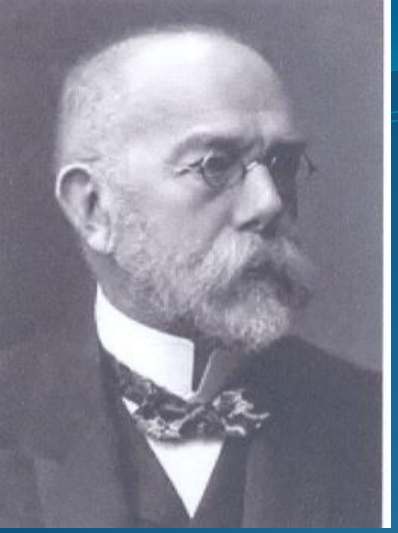
- Good contact investigation with proper follow-up & therapy. (HIPAA)
- Close monitoring of therapy of active cases with DOT & labs
- Testing all active cases for HIV & MDR & XMD.
- Testing of high risk individuals
- Knowledge of co-morbidities

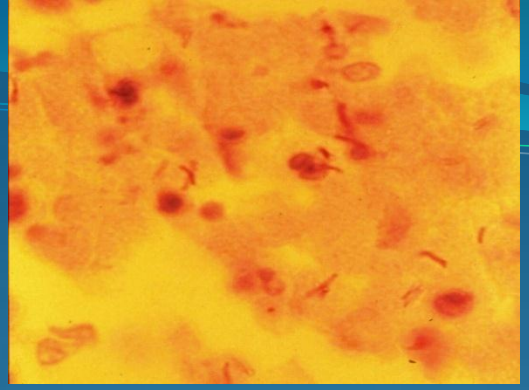
summary

- Great need exists for new drugs/regimens to address the unmet medical needs in TB therapy
- Ultimate success will require still stronger and more robust global TB drug pipeline
- New approach underway for the development of novel anti-TB drug regimens (CPTR initiative)

Questions

Thank you





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